

Original Research



Golden years but sleepless nights: a cross-sectional study on insomnia and sleep hygiene practices among the elderly attending urban health centres in Bengaluru, India

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Abstract

Introduction: The proportion of elderly persons aged 60 years and above in India is predicted to reach 19.6% of the total population by 2050. Insomnia impacts the overall health and quality of life of the elderly. Sleep hygiene practices play an important role in promoting healthy sleep patterns and enhancing the quality of sleep.

Objectives: To determine the proportion of insomnia and sleep hygiene practices and associated factors among elderly individuals attending selected urban health centres in Bengaluru City, India

Methods: A cross-sectional study was conducted using consecutive sampling among 125 elderly individuals attending two urban health centres in Bengaluru. A structured questionnaire consisting of sociodemographic details, Insomnia Severity Index (ISI) and Sleep Hygiene Index (SHI) was administered. Multivariate logistic regression was used to identify independent determinants of insomnia and sleep hygiene.

Results: The mean age (SD) of the participants was 67.54 (6.61) years. Insomnia and unhygienic sleep practices were prevalent in 64.8% and 67.2%, respectively. Insomnia was significantly more common among females (adjusted odds ratio (AOR): 2.34 (95% CI: 1.13, 2.88), those separated/widowed (AOR: 2.49 (95% CI: 1.01, 6.32), those with co-morbidities (AOR: 4.17 (95% CI: 1.05, 16.62) and those with urinary disturbances and paraesthesia of lower limbs (AOR: 3.07 (95% CI: 1.16, 8.12). Common factors contributing to unhygienic sleep practices included engaging in excessive thinking, planning or worrying in bed (59.2%), going to bed while feeling stressed or angry (55.4%) and excessive daytime napping (49.8%). Additionally, unhygienic sleep practice was significantly associated with insomnia (OR: 2.38 (95% CI: 1.09-5.16).

Conclusions & Recommendations: About two-thirds of participants were found to have insomnia and unhygienic sleep practices. These findings underscore the importance of addressing sleep-related problems among the elderly and highlight the need for primary care interventions at primary care that focus on promoting better sleep hygiene practices.

Key words: Elderly, Insomnia, Sleep hygiene, India

Introduction

Globally, the proportion of elderly individuals is predicted to rise from 13.4% in 2020 to 21.3% by 2050. It has also been projected that the number of people aged 80 years & above will triple by 2050 (1-2). In India, an elderly individual or senior citizen is defined as ‘any person who has attained the age of sixty years or above’ (3). The census of India shows that the elderly population has been gradually increasing from 5.5% in 1950 to 8.6% in 2011 and is currently predicted to reach 19.6% by 2050 (2, 4). The longer life expectancy, declining fertility rates and improving socioeconomic conditions are contributing to this expansion (5).

According to the International Classification of Sleep Disorders, an insomnia disorder is defined as ‘a persistent difficulty with sleep initiation, duration or consolidation that occurs despite adequate opportunity and circumstances for sleep and results in concern, dissatisfaction or perceived daytime impairment such as fatigue, decreased mood or irritability, general malaise or cognitive impairment’ (6). While insomnia is not a typical feature of the ageing process, its prevalence rises with age. It is a subjective experience that is commonly precipitated or aggravated by bereavement, recent relocation, anxiety, polypharmacy or comorbidities. It has a significant detrimental influence on the quality of life and everyday functioning of older persons, impacting cognitive, physical and emotional health (7). Insomnia may be exacerbated by poor sleep habits such as irregular sleep-wake cycles and daytime naps (8). Poor sleep over a continued period leads to several problems such as fatigue, lack of concentration, lapses in memory and irritability (9).

First introduced by Peter Hauri in 1977, sleep hygiene refers to behavioural activities that have been established to promote healthy sleep based on our understanding of sleep physiology and pharmacology (10-11). It is also often used to describe how lifestyle and environmental factors can affect sleep. Sleep

hygiene improvements in the elderly are a simple but effective way to enhance sleep quality (12).

It is imperative for health professionals to recognize the factors contributing to disrupted sleep, as this will be crucial for early detection of insomnia and to make evidence-based decisions and provide targeted strategies to improve sleep. Currently, research evidence on this issue is insufficiently documented, highlighting a need for a comprehensive exploration and understanding of the burden of insomnia in the Indian population. Therefore, the objectives of this study were to assess insomnia, sleep hygiene practices and their associated factors among elderly persons attending selected urban health centres in Bengaluru City, India.

Methods

This cross-sectional study was conducted from September to November 2022 in two urban primary health centres, one government and one private, in Bengaluru City. The study included all elderly individuals aged ≥ 60 years attending the two centres. Participants who had difficulty in comprehending the interview schedule were excluded. The minimum sample size calculated for the study was 90 using the prevalence of insomnia in elderly of 37% based on a study done in 2015 (13) and with absolute precision of 10%. The sample was recruited by consecutive sampling.

Data were collected using an interviewer-administered questionnaire, which included sociodemographic details and two standardized scales, ISI and SHI. The ISI has been designed to evaluate the severity of both nighttime and daytime components of insomnia with Cronbach’s alpha of 0.84 (14). It has seven questions, each scored between 0 and 4. The total scores are interpreted as ‘no clinically significant insomnia (0-7)’, ‘subthreshold insomnia (8-14)’, ‘moderate clinical insomnia (15-21)’ and ‘severe clinical insomnia (22-28)’. The SHI

is a 13-item tool to assess the presence of sleep hygiene behaviours with Cronbach's alpha of 0.618 (15-16). Each item is rated on a five-point Likert

scale (1 never to 5 always). The total scores range from 13 to 65, with a score less than or equal to 26 indicating unhygienic sleep (12, 17).

Table 1: Baseline characteristics of the study participants (N=125)

Characteristic	No.	%
Age (in years)		
60-69 years	51	40.8
≥70 years	74	59.2
Gender		
Male	51	40.8
Female	74	59.2
Religion		
Hindu	84	67.2
Others	41	32.8
Marital status		
Married	84	67.2
Others (Unmarried, Widowed)	41	32.8
Type of Family		
Living alone	14	11.2
Nuclear	70	56.0
Others	41	32.8
Education		
Illiterate	24	19.2
Studied 7th Std and below	59	47.2
Studied 8th & above	42	19.2
Occupation		
Gainfully employed	43	34.4
Not gainfully employed	82	65.6
Financial independence		
Yes	68	54.4
No	57	45.6
Substance use		
Yes	35	28.0
No	90	72.0
Comorbidities		
Present	114	91.2
Absent	11	8.8
Issues affecting sleep at night*		
Yes	49	39.2
No	76	60.8

*Paraesthesia of lower limbs, urinary disturbances

Intern medical officers, after receiving standardized training from the principal investigator, collected data at the primary health centres from Monday to Friday. A random 20% quality check of the data was done by the principal investigator.

Data analysis

The data were analysed using Microsoft Excel and Statistical Package for the Social Sciences (SPSS) version 20 (IBM Corp., New York, USA). Descriptive statistics such as frequency and percentages were used to describe categorical variables. Bivariate analysis was conducted using chi-squared test to identify variables having significant associations with the outcome of interest. A multivariate logistic regression was also performed with variables having a p-value <0.2 to identify independent determinants

of insomnia and sleep hygiene.

Results

The sample included 125 participants with a mean age (SD) of 67.54 (6.61) years. The majority were aged 70 years or older (59.2%), females (59.2%), Hindu (67.2%) by religion, married (67.2%) and unemployed (65.6%). More than half of the participants were living in a nuclear family and reported financial independence. Educational levels varied. Over 90% reported co-morbidities such as diabetes and hypertension and 28% reported substance use. Nearly 40% were suffering from paraesthesia of the lower limbs and urinary disturbances that were affecting their sleep at night (Table 1).

Table 2: Proportion of insomnia and sleep hygiene practices (N=125)

Outcomes	Score range	No.	%
Insomnia Severity Index (ISI)			
No clinically significant insomnia	0 - 7	44	35.2
Significant insomnia*	≥ 8	81	64.8
Sleep Hygiene Index (SHI)			
Hygienic practices	≤ 26	41	32.8
Unhygienic practices	> 26	84	67.2

*Subthreshold + Moderate

Among the participants, 64.8% experienced insomnia, which included both subthreshold and clinical/moderate levels. Also, 67% of the participants exhibited unhygienic sleep practices (Table 2). Several factors contributed to poor sleep hygiene, with 59.2% of the participants reporting thinking, planning or worrying in bed, 55.4% going to bed stressed or angry and 49.8% taking daytime naps. Additionally, 46.9% used their bed for activities such as reading, further disrupting their sleep quality.

The multivariate logistic regression analysis (Table 3) indicated that females had more than twice the risk of developing insomnia compared to males (AOR: 2.34; 95% CI: 1.13, 2.88). Being separated or widowed

(AOR: 2.48; 95% CI: 1.03, 6.31) and having comorbidities (AOR: 4.17; 95% CI: 1.05, 16.62) also significantly increased the risk. Additionally, participants who reported issues at night such as urinary disturbances, paraesthesia of lower limbs (AOR: 3.07; 95% CI: 1.16, 8.12) had a notably higher likelihood of insomnia. The model demonstrated good fit (Hosmer–Lemeshow test: $\chi^2=3.457$; df=7; p=0.84) and explained 28.2% of the variance (Nagelkerke $R^2=0.282$). Table 4 indicates that individuals who were separated or widowed had a significantly higher likelihood of having unhygienic sleep habits (AOR: 3.27; 95% CI: 1.68, 6.4; p<0.05) compared to those who were married. This model also demonstrated good fit (Hosmer–Lemeshow test:

$\chi^2=10.386$; $df=8$; $p=0.239$) and explained 30.1% of the variance (Nagelkerke $R^2=0.301$).

Table 3: Multivariate logistic regression analysis of factors associated with insomnia

Variable	Significant insomnia, No. (%)		OR (95% CI)	AOR* (95% CI)
	Absent (n=44)	Present (n=81)		
Age				
60-69 years	31 (41.9)	43 (58.1)	2.11	1.0
≥ 70 years	13 (25.5)	38 (74.5)	(0.96, 4.6)	0.39 (0.15, 2.17)
Gender				
Male	27 (52.9)	24 (47.1)	3.77	1.0
Female	17 (23.0)	57 (77.0)	(1.74, 8.16)	2.34 (1.13, 2.88)
Marital status				
Married	35 (41.7)	49 (58.3)	2.54	1.0
Others	9 (22.0)	32 (78.0)	(1.08, 5.99)	2.49 (1.01, 6.32)
Financial independence				
Yes	31 (45.6)	37 (54.4)	2.83	1.0
No	13 (22.8)	44 (77.2)	(1.3, 6.19)	1.43 (0.68, 3.04)
Comorbidities				
Yes	38 (33.3)	76 (66.7)	2.4	4.17 (1.05, 16.62)
No	6 (54.5)	5 (45.5)	(0.69, 8.37)	1.0
Issues affecting sleep at night				
Yes	11 (22.4)	38 (77.6)	2.65	3.07 (1.16, 8.12)
No issues	33 (43.4)	43 (56.6)	(1.17, 5.96)	1.00

*Adjusted for all variables with $p<0.2$; OR=odds ratio; AOR=adjusted odds ratio

Table 4: Multivariate logistic regression analysis of factors associated with sleep hygiene

Variable	Hygienic sleep (n=41)	Unhygienic sleep (n=84)	OR (95% CI)	Adjusted OR* (95% CI)
Marital status				
Married	24 (28.6)	60 (71.4)	0.56	1.0
Others	17 (41.5)	24 (58.5)	(0.26, 1.23)	3.27 (1.68, 6.4)
Occupation				
Gainfully employed	8 (18.6)	35 (81.4)	2.95	0.86 (0.46, 1.59)
Not gainfully employed	33 (40.2)	49 (59.8)	(1.21, 7.14)	1.0

*Adjusted for all variables with $p<0.2$; OR=odds ratio; AOR=adjusted odds ratio

Table 5: Association between sleep hygiene and insomnia (N=125)

Sleep hygiene	Insomnia, No. (%)		Odds ratio (95% CI)	p-value
	Absent (n=44)	Present (n=81)		
Hygienic	20 (48.8)	21 (51.2)	1.0	0.026
Unhygienic	24 (28.6)	60 (71.4)	2.38 (1.2, 5.16)	

The study showed a significant association between sleep hygiene and clinically significant insomnia. Elderly with unhygienic sleep habits had a higher chance of experiencing clinically significant insomnia (OR: 2.38; 95% CI: 1.2, 5.16; $p=0.026$) compared to those with hygienic sleep habits (Table 5).

Discussion

In this study, the mean age (SD) of study subjects was 67.54 (6.61) years which was similar to Dahale's study (18). More than half of the participants were elderly females, 67.2% were married and 65.6% were unemployed. Iyer et al. study also showed a similar pattern (13). However, this study showed higher levels of education and financial independency among participants in contrast to another study done in a rural setting (19). In this study, 56% of the participants were living in a nuclear family, while 11.2% lived alone. One study had comparable findings, such as 73% of the elderly participants living in nuclear families and a small number (7%) living alone (20). Nearly 40% of the participants experienced paraesthesia of the lower limbs and urinary disturbances, both of which affected their sleep at night. These symptoms are commonly associated with comorbidities such as diabetes (21).

Among the participants, 64.8% experienced significant insomnia, encompassing both subthreshold and clinical levels. Despite differences in methodological approaches, such as symptom definitions, assessment measures and study settings, the study findings align with previously reported rates, which range from 50% to 68% (13, 20, 22-23). Sleep hygiene assessment revealed unhygienic sleep practices in 67.2% of the participants. A study conducted at an elderly care institution found that 51.5% participants had poor sleep hygiene (12). It is also notable that the World Health Organization's 2015 World Report on Ageing and Health does not

address sleep disorders, despite their significant impact (24).

This study showed that females and those with comorbidities had a higher likelihood of experiencing insomnia. This was similar to findings of other studies (20, 25). The probable reason could be higher levels of stress and anxiety in females due to responsibilities in household activities and caregiving. Suffering from co-morbidities could lead to physical discomfort like neuropathy, which affects about 50% of diabetics after 10 years of disease duration (21), sleep disruptions from frequent urination (26), medication side effects impacting sleep (27) and increased stress and anxiety from managing chronic conditions. A similar significant association was present in this study as well – participants who reported nighttime issues such as urinary disturbances and paraesthesia of the lower limbs had a notably higher likelihood of insomnia (AOR: 3.07, 95% CI: 1.16, 8.12).

Participants who were separated or widowed had a higher odd of clinical insomnia and unhygienic sleep practices. Similar findings were reported by Sanjay et al., who found a higher prevalence of insomnia among individuals living single ($p<0.001$) and by Gouthaman et al., who reported poorer sleep quality among single or widowed individuals compared to those married ($p<0.05$). (23, 28). Reasons could be lack of companionship, absence of social and emotional support and potential financial insecurity.

Unhygienic sleep practices such as thinking or planning or worrying in bed, going to bed angry or stressed, taking daytime naps, and using bed for other activities like reading or watching television could lead to overall poorer sleep quality, contributing to a higher probability of experiencing significant insomnia compared to those with hygienic sleep habits which was shown in this study. Similar findings were noted in a study by McAlpine et al. (2024), where out of 35 behaviours assessed, 18 were significantly associated with poor sleep quality. Among the strongest predictors were worrying about

falling asleep while in bed, feeling stressed or in a negative emotional state before bedtime, pondering unresolved matters before bed, napping during the day, and using the bed for activities other than sleep (29).

This study had a few limitations. Consecutive sampling was done due to time constraints which could have led to potential selection bias, and the inclusion of only two institutions limits the diversity and generalizability of the findings. A 10% precision was used in the sample size calculation to ensure feasibility within available time and resources, though this may have reduced statistical power.

Conclusions & Recommendations

The study concludes that insomnia is prevalent among elderly individuals attending selected urban

health centres in Bengaluru, with 64.8% experiencing significant insomnia. The study also identified several factors significantly associated with insomnia, including being female, separated or widowed, having comorbidities and experiencing night-time issues. Additionally, a strong association was found between unhygienic sleep practices and clinically significant insomnia, with 67.2% of participants exhibiting poor sleep hygiene. Regular screening of the elderly for insomnia during geriatric clinics, training of health workers to identify and refer individuals with sleep issues and prompt diagnosing and treatment of non-communicable diseases that affect sleep is essential. Additionally, awareness should be created through health education regarding importance of sleep hygiene practices. There is also a scope for qualitative studies to be conducted to understand the reasons for insomnia.

Public Health Implications

- The high prevalence of insomnia and poor sleep hygiene practices in the elderly signals a public health concern as they are linked to increased risk of cognitive decline and reduced quality of life.
- If unaddressed, these sleep issues can lead to higher healthcare utilization and burden on caregivers and systems.
- Targeted interventions in primary care settings are essential to improve sleep quality and enhance overall well-being in older adults.

Author Declarations

Competing interests: The authors declare that they have no competing interests.

Ethics approval and consent to participate: Ethical clearance was obtained from St John's Institutional Ethics Committee (ST-253/2022) before the commencement of the study. Written informed consent was obtained from all participants before recruitment.

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